RESEARCH PROBLEM STATEMENT

Problem Title: Cost-effectiveness and Indicators for Pavement Rejuvenation **No.:**05-02.2

Submitted By: Scott Nussbaum **E-mail:** snussbaum@utah.gov

1. Briefly describe the problem to be addressed:

1 Determine the effectiveness of rejuvenating oils in extending the life of open-graded and chip seal coats.
2 Provide guidelines for conditions that indicate that rejuvenation is warranted.
3 Evaluate safety considerations associated with this application.

UDOT maintenance currently applies "rejuvenating" oil to our pavements between seal coats. The intent is to extend the life of the pavement, or the pavement seal coat. However, opinions are mixed as to its effectiveness. Rejuvenation may also temporarily affect skid resistance, and masks paint or tape lines to some degree, leading some to ask if it is worth the cost and effort.

A UDOT report MR-89-002, was completed in 1990. At the time, performance evaluation testing was not as advanced as it is now, and the Department has moved from approved proprietary agents to generic specifications, and literature suggests that the different agents may have significantly different results and even differences in optimal application rates, but to my knowledge, this has not been addressed within the department.

2. List the research objective(s) to be accomplished:

1. Determine the effectiveness of rejuvenation oils under various typical conditions on chip open-graded seal coats. Consider varying applications of standard oil types specified by UDOT maintenance contracts as well as traffic volume.
2. Evaluate safety considerations associated with the application of rejuvenation oil to include skid-resistance and obscuring of pavement markings.
3. Provide recommendations for the use of rejuvenating oils with consideration for cost-effectiveness, traffic volume, safety, and seal coat type and condition.

3. List the major tasks required to accomplish the research objective(s): **Estimated person-hours**

1.	Select control and test sections for evaluation.	300
2.	Evaluate pavement condition, skid resistance, and pavement marking retroreflectivity.	160
3.	Apply the rejuvenating oils to the test sections.	60
4.	Monitor short-term skid resistance, and marking retroreflectivity.	100
5.	Monitor Long-Term pavement performance. (4-5 yrs).	400
6.	Analyze data, provide recommendations.	160

4. Outline the proposed schedule (when do you need this done, and how we will get there):

Begin during the summer of 2005, with selection and application of rejuvenation oils. Monitor skid resistance and pavement markings for 1 year.

Evaluate pavement conditions regularly for 3 years.

Provide recommendations in 2008.

5. Indicate type of research and / or development project this is:

Large: ☒ Research Project ☐ Development Project
Small: ☐ Research Evaluation ☐ Experimental Feature ☐ New Product Evaluation ☐ Tech Transfer Initiative : ☐ Other

6. What type of entity is best suited to perform this project (University, Consultant, UDOT Staff, Other Agency, Other)?

University with Input from UDOT Staff.

7. What deliverable(s) would you like to receive at the end of the project? (e.g. useable technical product, design method, technique, training, workshops, report, manual of practice, policy, procedure, specification, standard, software, hardware, equipment, training tool, etc.)

A technical report detailing when rejuvenation is a benefit, and which types of oil are right for which kinds of seals, and what application rates are appropriate.

8. Describe how will this project be implemented at UDOT.

The results would significantly affect how UDOT manages approximately $1,000,000 in rejuvenation dollars annually and the associated costs of pavement striping, perhaps making a significant impact on pavement performance.

9. Describe how UDOT will benefit from the implementation of this project, and who the beneficiaries will be.

UDOT maintenance will benefit from a cost and safety analysis by making the best decisions for pavement preservation dollars and consideration for public safety.

10. Describe the expected risks, obstacles, and strategies to overcome these.

11. List the key UDOT Champion of this project (person who will help Research steer and lead this project, and will participate in implementation of the results): Scott Nussbaum, Region One Maintenance, 801-620-1637

12. Estimate the cost of this research study including implementation effort (use person-hours from No. 3): $80,0000

13. List other champions (UDOT and non-UDOT) who are interested in and willing to participate in the Technical Advisory Committee for this study:

	Name	Organization/Division/Region	Phone	Attended UTRAC?
A)		Nathan Lee, Region One Materials, 801-620-1600		N
B)		Scott Goodliffe, Area Supervisor, 801-620-1610		N
C)		Brian Phillips, Region 3 Maintenance Engineer, 801-227-8055		Y
D)		Bill Townsend, Region 2 Maintenance Engineer, 801-975-4929		Y
E)		Lynn Bernhard, Central Maintenance, 964-4596		Y
F)				
G)				

14. Identify other Utah agencies, regional or national agencies, or other groups that may have an interest in supporting this study:

UDOT Central Materials, Region Operations Engineers